

REMARKS

Claims 1 – 20 are pending and under consideration in the above-identified application.

In the Office Action, Claims 1 – 20 were rejected, and withdrawn claims 9 – 20 have rejoined the previously elected claims

In this Amendment, Claims 1, 6, 9 and 15 are amended, and Claims 21 - 24 are added. No new matter has been introduced as a result of this Amendment.

Accordingly, Claims 1 – 24 are at issue.

I. 35 U.S.C. § 102 Anticipation Rejection of Claims 1-10, 12-16 and 18-20

Claims 1-10, 12-16 and 18-20 were rejected under 35 U.S.C. § 102(b) as being anticipated by Miyatake (U.S. Patent No. 6,046,508).

Claim 1 is directed to a wafer. The wafer comprises alignment marks on an exposure surface, the alignment marks having edges for scattering inspection light for alignment during an exposure. The alignment mark is configured to have a plurality of dot pattern groups, each of the dot pattern groups being projections from the exposure surface and configured to have a plurality of dot patterns arrayed in a *first* predetermined direction. The plurality of dot pattern groups are arrayed in the *first* predetermined direction with a *first* interval between the dot pattern groups, the *first* interval being wider than a *second* interval between the dot patterns. *The plurality of dot pattern groups are arrayed in a second predetermined direction perpendicular to the first predetermined direction with a third interval between adjacent dot pattern groups, the third interval being wider than an interval between the dot patterns.*

That is, the plurality of dot pattern groups are arrayed in the first predetermined direction with a first interval between the dot pattern groups, and are in a second predetermined direction perpendicular to the first predetermined direction with a third interval between adjacent dot pattern groups. Moreover, the first interval and the third interval are wider than an interval between the dot patterns.

This is clearly unlike Miyatake. The Examiner points to Column 4, lines 22 – 23 and FIGs. 2C and 15A for supports that Miyatake discloses all of the limitation claimed in the instant patent application.

However, Miyatake states in regard to FIG. 2C that (emphasis added):

“The left side of FIG. 2C shows the images focused on the light reception plane of the image detector 21 of FIG. 2A. Taking the direction of intersecting the incidence plane including the observation optical axis with the light reception plane as the x-axis and the direction perpendicular to the x-axis in the light reception plane as the y-axis, an image of one edge becomes a straight line shape in parallel to the y-axis. Therefore, the image of each mark has three straight line shapes in parallel to the y-axis and disposed in the x-axis direction.

Between a pair of images 13A formed by light scattered at the edges of the wafer marks 13, an image 14A is formed by light scattered at the edges of the mask mark 14. Since the observation optical axis is oblique to the exposure plane, the wafer mark images 13A and mask mark image 14A are detected at different positions along the x-axis direction. The right side of FIG. 2C shows an intensity distribution of images of wafer marks 13A and mask mark 14A along the y-axis direction. The distance between the center of one of the wafer mark images 13A and the center of the mask mark image 14A in the y-axis direction is represented by y1, and the distance between the center of the other of the wafer mark images 13A and the center of the mask mark image 14A in the y-axis direction is represented by y2. Through the measurements of the distances y1 and y2, the relationship of a relative position in the y-axis between the wafer marks 13 and mask mark 14 can be known.”

See Column 6, lines 41 – 67, and that in regard to FIG. 15A that (emphasis added):

“FIG. 15A is a plan view of a wafer mark according to the sixth embodiment. Twenty one rectangular edge patterns 70 are disposed in the X-axis direction at a pitch of 4 μ m. This edge pattern column is disposed in three columns in the Y-axis direction.”

Thus, in Miyatake FIG. 2C illustrate images of wafer marks 13 and 14. In addition, Miyatake states that position alignment wafer marks 13 are formed on the exposure surface of the wafer 11, and a position alignment mask mark 14 is formed on the mask surface of the mask 12. Further, the wafer 11 and mask 12 are disposed in parallel, forming a constant gap between the exposure surface of the wafer 11 and the bottom surface (mask surface) of the mask 12. Therefore, Miyatake does not teach or suggest that the alignment mark is configured to have a plurality of dot pattern groups, with each of the dot pattern groups being projections from the exposure surface and configured to have a plurality of dot patterns arrayed in a *first* predetermined direction.

Moreover, FIG. 15A illustrates twenty one rectangular edge patterns 70 disposed in the X-axis direction at a pitch of 4 μm , with the edge pattern column being disposed in three columns in the Y-axis (first) direction. Therefore, Miyatake does not teach or suggest that the plurality of edge patterns (dot pattern groups) are arrayed in the first predetermined direction with a first interval between the dot pattern groups, such that the first interval is wider than a second interval between the dot patterns.

Thus, Claim 1 is patentable over Miyatake, as are dependent Claims 2 – 5, for at least the same reasons.

Claims 6, 9 and 15 have been amended to recite the same distinguishing limitations as those of Claim 1. Thus, Claims 6, 9 and 15 are patentable over Miyatake, as are dependent Claims 7 – 8, 10, 12 – 14, 16 and 18 – 20, for at least the same reasons.

New Claims 21 – 24 are also patentable over Miyatake as being dependent on Claims 1, 6, 9 and 15 shown above to be patentable over Miyatake.

Accordingly, Applicants respectfully request that these claim rejections be withdrawn.

II. 35 U.S.C. § 102 Anticipation Rejection of Claims 1 and 3-8

Claims 1 and 3-8 were rejected under 35 U.S.C. § 102(b) as being anticipated by Tominaga (U.S. Patent No. 5,525,840).

The Examiner points to FIG. 1A and FIG. 6 for support that Tominaga discloses all of the limitations recited in Claims 1 and 6. However, Tominaga fails to teach or suggest that the plurality of dot pattern groups are arrayed in the first predetermined direction with a first interval between the dot pattern groups, the first interval being wider than a second interval between the dot patterns. Moreover, that the plurality of dot pattern groups are arrayed in a second predetermined direction perpendicular to the first predetermined direction with a third interval

between adjacent dot pattern groups, the third interval being wider than an interval between the dot patterns.

Thus, Claims 1 and 6 are patentable over Tominaga, as are corresponding dependent Claims 2 – 5 and 7 – 8, for at least the same reasons.

Accordingly, Applicants respectfully request that these claim rejections be withdrawn.

III. 35 U.S.C. § 103 Obviousness Rejection of Claims 11 and 17

Claims 11 and 17 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Miyatake (U.S. Patent No. 6,046,508) in view of Schulz (U.S. Publication No. 2003-0044702).

Claims 11 and 17 are dependent on Claims 9 and 15, shown above to be patentable over Miyatake. Moreover, in addition to Miyatake Schulz also fails to teach or suggest that the plurality of dot pattern groups are arrayed in the first predetermined direction with a first interval between the dot pattern groups, the first interval being wider than a second interval between the dot patterns. Moreover, that the plurality of dot pattern groups are arrayed in a second predetermined direction perpendicular to the first predetermined direction with a third interval between adjacent dot pattern groups, the third interval being wider than an interval between the dot patterns.

Therefore, Miyatake and Schultz may not properly be combined to reject Claims 9 and 15. As such, Claims 9 and 15 are patentable over Miyatake in view of Schultz, as are dependent Claims 11 and 17, for at least the same reasons.

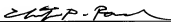
Accordingly, Applicants respectfully request that these claim rejections be withdrawn.

IV. Conclusion

In view of the above amendments and remarks, Applicant submits that Claims 1 – 24 are clearly allowable over the cited prior art, and respectfully requests early and favorable notification to that effect.

Respectfully submitted,

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By: 
Christopher P. Rauch
Registration No. 45,034
SONNENSCHNATH & ROSENTHAL LLP
P.O. Box 061080
Wacker Drive Station, Sears Tower
Chicago, Illinois 60606-1080
(312) 876-8000